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ABSTRACT

This publication recognizes the constantly changing requirements of the construction field and varying conditions for employment opportunities. It addresses the goal of relevance in education by enabling the educator to make timely adjustments in the subject matter of the construction curriculum. There are six sections in this publication, each of which can assist the vocational education teacher in evaluating and improving existing materials and in developing new subject matter. The sections cover the following topics: (1) program goals in the construction cluster, (2) changing industry trends and trade practices, (3) employment trends in construction trades, (4) equipment needs, (5) subject matter changes, and (6) essential learning skills. By using this information, the teaching staff may achieve higher levels of classroom productivity--a productivity that not only recognizes future needs but also fosters strong linkages between educators, students, and the associated industries. (This update represents the opinions of industry people and is not the result of a detailed analysis of occupations.) (KC)

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Construction

Division of Vocational Education
Oregon Department of Education, Salem

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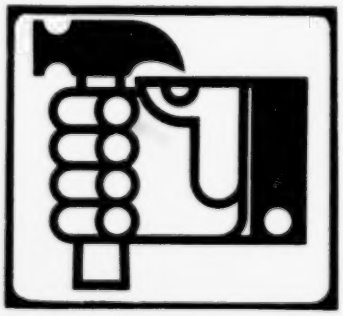

Subject Matter

Update

1986 - 87

Construction

1985

Oregon Department of Education
700 Pringle Parkway SE
Salem, OR 97310-0290

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Title II—Vocational Education Equal Opportunity Specialist

Title VI and Title IX—Coordinator, Title IV, Civil Rights

Section 504—Associate Superintendent, Division of Special Education and Student Services

Inquiries may be addressed to the Oregon Department of Education, 700 Pringle Parkway SE, Salem 973-0290 or to the Regional Office for Civil Rights, Region X, M/S 106, 2901 Third Avenue, Seattle 98121.

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Foreword

In keeping with the theme for excellence in education as established by the Oregon Action Plan, the Department of Education is enthusiastically committed to strengthening its ability to provide education that is relevant and applicable. An effective vocational education program will meet the needs of the students and, at the same time, meet the goals of the State's education system.

This publication, Subject Matter Update—1986-87, recognizes the constantly changing requirements of industry and varying conditions for employment opportunities. It speaks to the goal of relevance in education by enabling the educator to make timely subject matter adjustments.

There are six sections in this publication, each of which assists the vocational education teacher in evaluating and improving existing material and in developing new subject matter. By using this information, the teaching staff may achieve higher levels of classroom productivity—a productivity that not only recognizes future needs but also fosters strong linkages between educators, students, and the associated industries.

This update represents the opinions of industry people and is not the result of a detailed analysis of occupations. The educator should regard it as a tool for the review of program subject matter. For further information, contact the Division of Vocational Education, 378-2127.

Verne A. Duncan
State Superintendent
of Public Instruction

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INTRODUCTION

Vocational Education—Responding to the Future

Educators must deal with a great many issues during the remainder of this decade if vocational education is to respond to the needs of students as well as business, industry and labor. The Oregon Action Plan for Excellence in Education clearly calls for schools to provide a balanced and comprehensive curriculum for each student. Vocational education is an important part of that curriculum. As such, it is critical that programs in vocational education strive for excellence.

The most important component of excellence in vocational education is clearly the curriculum—what students are taught. Thus, it is essential that subject matter be kept as current as possible. As industries change directions, new job skills become necessary. Gradually, new occupations emerge as industry moves to incorporate new development technology.

There must be a system in place to capture this change and transform it into updated curriculum in vocational programs. It is not enough to say that five years from now there will be these new occupations requiring these kinds of skills and knowledge. Rather, curriculum should be evaluated frequently based on the best advice of people who work in those industries and occupational areas so that five years from now, students will be competitive in the labor market.

Meeting the Challenge

This is the concept that the Oregon Department of Education's Division of Vocational Education feels is essential to address. After all, subject matter really defines each occupational program, dictating facility and equipment needs, the skills of teachers and even the composition of program advisory committees. The first step then, is the formation of professional groups from industry and labor who have special knowledge about the needs and trends in their fields. Their task is to review program and course goals, and to give their views of industry changes and labor market needs. Through a grant from the Department of Education to Oregon State University, these technical committees will provide teachers with updated information every two years so that local programs can continually meet the challenge of excellence.

About the Technical Committee

The Oregon Department of Education and Oregon State University considered the staffing of the technical committee a critical factor for the success of this project. The individuals selected have outstanding records of achievement and significant prior working experience in the occupations covered in the Construction Products Cluster Program.

Members of the technical committee are

Ron Anderson
Construction Industry
Equipment Operators Training
Portland

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Construction Industry
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Benson High School
Canby

Bob Topping
Construction Industry
Home Builder
Portland

This Subject Matter Update for Vocational Education Cluster Programs is a joint project of Oregon State University and the Oregon Department of Education.

Program Goals in the Construction Cluster

Oregon has been using a goal-based planning system. This means that the State determines state goals; districts look to these state goals in working out their district goals; various programs consider the district goals as individual program goals are developed; and finally, course goals are formulated which support the program goals.

The technical committee members reviewed the State's Construction Vocational Cluster Program goals and unanimously determined that all of the goals remain important to the occupations within the field. The eight established goals are given below in the order in which the committee ranked them—the most important listed first.

Students who complete the Construction Program

1. Will be able to work safely in a construction environment.
2. Will be able to select, use and maintain tools and equipment of the construction trades.
3. Will be able to communicate through the written, spoken, and symbolic language of the construction industry.
4. Will be able to select appropriate construction materials and utilize correct construction methods and techniques.
5. Will be able to apply appropriate human relations skills in a work setting.
6. Will be able to identify a variety of career options and career ladders including entrepreneurship available within the construction trades.
7. Will be able to utilize basic scientific data and principles common to construction occupations.
8. Will be able to perform mathematical calculations that are commonly used by construction workers.

Although the goal (number 5) dealing with human relations skills ranked fifth by committee vote, a minority vote stressed the importance of sound organizational behavior practices and, as a result, caused this goal to rank equally with the first.

Changing Industry Trends and Trade Practices

Industry Trends

The industries that employ graduates of construction programs are undergoing major changes, some of which may create new job opportunities in the future. Many will require a more sophisticated set of skills and knowledge.

The committee identified five trends and trade practices that will have the greatest impact on the Construction Program.

1. **Increasing use of assembled construction components.** The structures of today are assembled from shop or factory built components. Sections and modules are fabricated in forms and jigs inside environmentally controlled factories with assembly line laborers. Depending on appropriate benefit and cost ratios, robotics technology should be considered for possible assembly line implementation. Clearly, the study of prefabrication fundamentals, assembly line processes, and a basic understanding of robotics are becoming important within the industry.

2. **More emphasis on the use of advanced technology for construction.** In addition to robotic technology implementation on the manufacturing assembly lines, sophisticated tools and machinery are being used in the assembly of the structures on the building site. More and more, power equipment is being developed and manufactured to replace hand tools normally used for building residential housing and commercial construction. The transition from manual to machine-assisted construction emphasizes the changes in subject matter that must occur.

3. **More emphasis on reading and comprehending plans and instructions.** In commercial construction, workers are becoming assemblers of parts, components, and completed units. Workers must also learn new building codes, methods, and material specifications and standards as industry adjusts its adherence from regional to national regulations. Additionally, many components are pre-assembled for residential housing and remodeling. Fewer labor hours will be required to complete a project, which places a greater burden on the worker to increase his or her skill in reading comprehension in order to remain competitive.

4. **Increased emphasis on multi-trade capability.** Although entry and journeyman levels have become less skilled on the average, industry is dependent on rapidly cross-training employees into other job categories when it becomes an economic necessity. Therefore, entry level and journeyman workers must be mentally prepared to accept transition to other jobs in construction as well as being amenable to achieving higher skill levels and willing to maximize productivity. Coupled with these worker upgrading functions is the growing need to be aware of construction costs. Industry expects its employees to have a general background in cost engineering, that is, time related to value of money. Additionally, there is a trend towards open shop and alternative training programs.

5. **Trends towards awareness of worker well-being and organizational behavior.** Industry is becoming acutely aware of worker motivation—the key to achievement. More emphasis is on worker satisfaction, individual maintenance and understanding of physical and mental health, stress tolerances, and general attitude towards work. There is also an effort to include the employee in team-approach problem-solving which permits the worker to contribute to the total task, and therefore gain recognition, status congruence, and the benefits of leadership roles. These interacting social functions can lead to job satisfaction provided they are administered properly.

Employment Trends in the Construction Cluster

Today's graduates will enter a job market that has a surplus of workers. The 1.7 million housing starts nationally, and those predicted for the future, may not help Oregon's construction industry due to a surplus of housing in Oregon. Self-employment is significant in this cluster. For example, according to the 1980 census, approximately 50 percent of the carpenters were self-employed in Oregon. Additionally, this labor force is considered to be highly mobile. Considering both future employment outlook and the number of existing programs, the need for program development and expansion must be examined carefully. More important, only those students who have been exposed to the appropriate programs, who have excelled in those programs, and who possess excellent skills in communication—reading comprehension, technical writing, and oral expression—can expect to successfully compete for the limited job openings anticipated from 1986 to 1988.

The Oregon Employment Division forecasts construction employment in 1986 at 37,656 jobs, which includes 2,608 new openings in the state. The 1988 forecast is somewhat higher—40,641 employed, with 2,740 new openings anticipated. The unemployment rate among construction workers for 1983 was 33 percent; however 1984 reflected a lower unemployment rate of 27 percent.

Data from the 1984 State of Oregon Labor Market Information report is presented here to establish forecasts for employment conditions and job openings for 1986 and 1988 for each Classification of Instructional Program (CIP) within the Construction Cluster Program.

Civil Technology. Reasonable employment opportunities exist in this CIP even though there is a surplus of workers. The ratio of unemployed to openings is about two to one. The unemployment rate for civil engineers is low at 5.8 percent, whereas surveyors have a high at 25.8 percent. Openings for civil engineer helpers and technicians are expected to be average due to an industrial growth rate of 2.5 percent. Job openings are expected to be 251 in 1986 and 262 during 1988. Only one-third to one-half of these openings are expected to be filled by helpers and technicians.

Tile/Masonry. Reasonable employment opportunities do not exist due to the lack of construction activity and small demand. Coupled with this dilemma is the surplus of workers in this CIP. The ratio of unemployed to openings is more than three to one. The unemployed rate for bricklayers is well above average at 28.5 percent. Openings for bricklayers are above average due to an industrial growth rate of 9.3 percent; however much of this growth simply recoups the losses from previous recession years. Bricklayers lost 80 percent of their employment between 1979 and 1982. Occupations in this CIP are sensitive to business cycle fluctuations. Job openings are forecasted to be 60 in 1986 and 64 during 1988.

Carpentry. Reasonable employment opportunities do not exist due to a lack of construction activities and high unemployment rates. Additional complications exist due to a surplus of workers for this CIP. However, approximately 30 percent of all carpenters are self-employed. The ratio of unemployed to openings is over five to one. The unemployment rate for carpenters is considerably above average at 36.6 percent. Openings for carpenters are above average due to an industrial growth rate of 6.5 percent; however much of the growth will simply recoup losses from previous recession years. Carpenters lost 42 percent of their employment between 1979 and 1982. Job openings are expected to be 804 in 1986 and 848 in 1988.

Glazing. Reasonable employment opportunities do not exist due to a lack of construction activity and small demand. Approximately 23 percent of the glazers are self-employed. Data indicate a surplus of workers for wage and salary jobs. The ratio of unemployed to openings is three to one. The unemployment rate for glazers is 17.3 percent. Job openings are predicted to be 36 in 1986 and 37 during 1988.

Painting and Decorating. Reasonable employment opportunities do not exist due to an oversupply of experienced workers and lack of construction activity. At least 21 percent of the painters are self-employed. The ratio of unemployed to openings for wage and salary jobs is more than six to one. The unemployment rate for maintenance painters is considerably above average at 31 percent. Forecasts indicate that there will be 109 openings in 1986 and 115 during 1988.

Plastering. Reasonable employment opportunities do not exist due to a small demand. Data indicate a surplus of workers for this CIP. Approximately 32 percent of the plasterers are self-employed. The ratio of unemployed to openings is two to one. The unemployment rate is 21.3 percent. Plasterers lost 71 percent of their employment between 1979 and 1983. Job openings are expected to be 31 in 1986 and 32 during 1988.

Roofing. Reasonable employment opportunities do not exist due to the oversupply of experienced workers. Many roofers are self-employed, independent contractors. The ratio of unemployed to openings is more than eight to one. The unemployment rate for roofers is considerably above average at 39.5 percent. Roofers lost 28 percent of their employment between 1979 and 1982. Job openings are anticipated to be 45 in 1986 and 47 during 1988.

Construction Trades/Other. Reasonable employment opportunities do not exist due to an oversupply of experienced workers and a lack of construction activity. The ratio of unemployed to openings is seven to one. The unemployment rate for cement masons is considerably above average at 35.2 percent. Job openings for this CIP are expected to rise from 444 in 1986 to 463 during 1988.

Plumbing/Pipefitting. Reasonable employment opportunities do not exist due to the oversupply of experienced workers and the lack of construction activity. The ratio of unemployed to openings is greater than two to one. The unemployment rate for plumbers is above average at 17.5 percent. Job openings are expected to be 265 in 1986 and 277 during 1988.

Millwork/Cabinet Making. Reasonable employment opportunities do not exist due to an oversupply of experienced workers. Approximately 27 percent of the cabinetmakers are self-employed. The ratio of unemployed to openings is greater than two to one. The unemployment rate for cabinetmakers is considerably above average at 29.7 percent. Cabinetmakers lost 23 percent of their wage and salary employment between 1979 and 1982. Job openings are forecasted to be 171 in 1986 and 185 in 1988.

Construction Equipment Operation. Reasonable employment opportunities do not exist due to an oversupply of experienced workers and a lack of construction activities. The ratio of unemployed to openings is more than six to one. The unemployment rate for heavy equipment operators is considerably above average at 29 percent. Job openings are expected to rise slightly from 363 in 1986 to 379 during 1988.

In summary, there was a surplus of construction workers during 1984, due to poor economic conditions. The ratio of unemployed to openings during 1984 was five to one. The overall unemployment rate for all occupations within this program group is 33 percent (1983 data). The employment division refers an average of three people for every job openings it receives. Even though there is a surplus of workers in this program now, industry maintains its concern about having an adequate supply of highly skilled workers for the future. Therefore, it is imperative that competent replacement technicians be prepared to meet this need. It is more important than ever before to evaluate the training offered in the Construction Cluster. To prepare students for the future, all educators must understand where that future lies.

Equipment Needs

The members of the technical committee were requested to make recommendations on equipment needed in the Construction Program beyond the basic tools and shop equipment. They indicated that most schools are stocked with a good variety of stationary equipment and basic portable tools. They also stated that none of the present tools and equipment are to be classified as obsolete.

The comittee recommends

- State-of-the-art pneumatic and electric handheld tools.
- Specialized tools for metal framing work and for drilling into masonry structures for special anchors and other fastening devices.
- Current video tapes that will provide invaluable information regarding advancements in technology relevant to the program CIP subgroups.

Subject Matter Changes

The members of the technical committee were asked to evaluate current subject matter in the construction program. The following chart illustrates their judgment and indicates the relative importance they assigned to each subject matter item. A zero represents total obsolescence of the subject matter item and a five indicates maximum importance. The majority of the committee members indicated that all of the subject matter material is valid for instruction. The committee also listed its recommendations for future requirements, which are summarized at the end of the chart.

	(1) SUBJECT MATTER ITEM	(2) RELATIVE IMPORTANCE RATE 0 - 5
1.0	SAFETY	
1.1	Protective clothing equipment	4
1.2	Lifting and carrying	4
1.3	Electric power tools	5
1.4	Pneumatic tools	3
1.5	Ladders	4
1.6	Scaffolding	4
1.7	Eye protection	5
1.8	Dust, fumes, gases	4
1.9	Ear protection	4
1.10	Handling materials	3
1.11	Hand tools	4
1.12	Flammable	4
1.13	Fire prevention	4
1.14	Good housekeeping	4
1.15	First aid/CPR	4
2.0	TOOL AND EQUIPMENT MENT SELECTION, USE AND MAINTENANCE	
2.1	Handtools	4
2.2	Power tools	5
2.3	Fasteners	4
2.4	Measuring	4
2.5	Marking	4
2.6	Layout	5
2.7	Boring	2
2.8	Fastening	4
2.9	Prying	2
2.10	Sawing	3
2.11	Cutting	4
2.12	Holding	3
2.13	Threading	3
2.14	Finishing	4
2.15	Soldering	3
2.16	Grinding	3
3.0	MATH	
3.1	Add, subtract, multiply, divide	5
3.2	Decimals	3
3.3	Fractions	5
3.4	Percent	5
3.5	Ratio and proportion	5
3.6	Area of rectangles	5
3.7	Area of circles	5
3.8	Volume	5
3.9	Geometric principles	5
4.0	SCIENTIFIC DATA/ PRINCIPLES	
4.1	Property of Soils	1
4.2	Erosion/percolation/ watertable	1
4.3	Mechanical factors	
	a. Compression	3
	b. Tensile strength	3
	c. Modulus of elasticity	2
	d. Shear strength	3
	e. Live load	4
	f. Rigging and hoisting	4
4.4	Sound transmission/ insulation	2
4.5	Heat transfer/insulation	3
4.6	Alternative energy sources	4
4.7	Metallurgy of structural steels	3
4.8	Chemistry of paints, thinners, solvents, plastics, and roofing materials	3
4.9	Water-cement ratio hydration process	3
4.10	Plumbing/electrical codes	4
5.0	SELECT MATERIALS AND CONSTRUCTION TECHNIQUES	
5.1	Pre-construction planning	
	a. Building codes	5
	b. Permits	3
	c. Cost estimates	4
	d. Excavations	3
5.2	Energy efficiency	
	a. Heat storage	3
	b. Heat transfer	3
	c. Heat loss	3
	d. Heating systems	3
	e. Weather influence	3

	(1) SUBJECT MATTER ITEM	(2) RELATIVE IMPORTANCE RATE 0 - 5
	f. 0Solar	4
	g. Design fundamentals	4
	h. Economics	4
5.3	Layout	
	a. Grades	5
	b. Layout lines	5
	c. Batter boards	3
	d. Laser transit	4
5.4	Lumber	
	a. Dimensional lumber	4
	b. Plywood	4
	c. Finish and trim	4
5.5	Brick, stone, masonry	
	a. Forms	4
	b. Estimation	4
	c. Placing	4
	d. Finishing	4
	e. Form removal	3
	f. Fireplace	3
	g. Masonry floor and trim	4
5.6	Reinforcing steel	
	a. Layout reinforcement	4
	b. Store and Lift	2
	c. Place	3
5.7	Framing	
	a. Sills	3
	b. Floor systems	5
	c. Rough plumbing (other)	4
	d. Walls	5
	e. Rough plumbing (upper)	4
	f. Sheathing	3
	g. Stairway	4
	h. Roof	4
5.8	Roofing Materials	
	a. Built-up	4
	b. Woodshingles	4
	c. Cedar Shakes	4
	d. Fiberglass	4
	e. Metal	4
	f. Tile	4
5.9	Exterior siding, trim	
	a. Plywood	4
	b. Vertical/horizontal	4
	c. Aluminum	3
	d. Stucco	3
5.10	Plumbing	
	a. Code	4
	b. Terms	3
	c. Supply systems	4
	d. Waste systems	4
	e. Venting	4
	f. Appliances	2
	g. Installation	3
5.11	Electrical	
	a. Code	4
	b. Terms	3
	c. Requirements	3
	d. Service panel	4
	e. Circuits	4
	f. Appliances	2
5.12	Insulation	
	a. Codes	4
	b. Types	3
	c. Characteristics	3
	d. Applications	4
	e. Installation	4
5.13	Drywall	
	a. Sheet rock	4
	b. Mud and tape	4
	c. Texture	3
	d. Plaster	3
5.14	Doors and windows	
	a. Frames and Casings	4
	b. Jambs	4
	c. Hardware	4
5.15	Exterior/interior paint/paper	
	a. Surface preparation	5
	b. Sealers	4
	c. Fillers	3
	d. Stains	4
	e. Paints	4
	f. Varnishes	4
	g. Lacquers	4
	h. Preservatives	4
	i. Solvents and Thinners	4
	j. Caulking	4
	k. Wallpaper	3
5.16	Cabinets and Millwork	
	a. Cabinets	5
	b. Shelving	3
	c. Closets	3
	d. Paneling	3
	e. Surrounds and casing	4
	f. Baseboards	3
	g. Laminates	4
5.17	Floor coverings	
	a. Codes	4
	b. Underlayment	4
	c. Wood floors	3
	d. Carpet	4
	e. Masonry	3
	f. Tile	3
	g. Flagstone	2
6.0	HUMAN RELATIONS	
6.1	Positive job attitude	
	a. Safe working attitude	5
	b. Responsibility	5
	c. Punctuality	5
	d. Honesty	5
	e. Good health habits	4
6.2	Cooperative Attitude	
	a. Follow orders	5
	b. Work with others	5
6.3	Leadership	
	a. Craftsmanship	5
	b. Responsible for others	5
	c. Respect for others	5
	d. Accept help	5
	e. Give help	5

	(1) SUBJECT MATTER ITEM	(2) RELATIVE IMPORTANCE RATE 0 - 5
7.0	CAREER OPTIONS/ ENTREPRENEURSHIP	
7.1	Working conditions	4
7.2	Becoming an entrepreneur	3
7.3	Career ladders	4
7.4	Job search	5
7.5	Entrepreneurship	3
8.0	COMMUNICATION SKILLS	
8.1	Read and interpret blueprints	
	a. Plot plans	5
	b. Foundation plans	5
	c. Floor plans	5
	d. Elevations	5
	e. Structural	5
	f. Heating, ventilation, air conditioning	4
	g. Plumbing	4
	h. Electrical	4
	i. Sketching	3
8.2	Read and interpret related material	
	a. Work orders	5
	b. Work schedules	4
	c. Handbooks, catalogs, manuals	4
	d. Bills of materials	3
8.3	Oral communication	
	a. Telephone	3
	b. Give directions	4
	c. Receive instructions	5
8.4	Construction terminology	
	a. Terms	5
	b. Symbols	5
	c. Abbreviations	5
	d. Jargon	5

Recommendations for Subject Matter Evaluation

The technical committee offered these recommendations.

The committee recommended that the students be subjected to well planned and executed audio-visual aid instruction, selected trade journals, and field trips for on-site orientation so that the students would be thoroughly prepared for the demands placed upon them when they entered the construction job market. The committee stated that there is a vast difference between the merits of on-the-job-training and that which is learned in the classroom. Organized and sponsored field trips are hoped to bridge the gaps between what can be learned in the classroom and visits to on-site locations. They also stressed that educators must train and encourage students to be versatile, to think, to reason, and to have the strong desire to be accurate with details.

The committee suggested future requirements for subject matter items to be taught during the next five years. They include the following suggested list of new subject matter descriptions.

1. Time should be alloted to show the process of mass production through audio-visual aids and/or field trips.

2. Students should receive introductory class work concerning the technology of alternate housing and shelters.

3. Since there is constant development of new construction products, educators should devise methods for keeping their students informed and inspiring them to seek knowledge on their own.

4. There are many necessary functions in the construction process that do not appear as part of the finished structure. For example, the student should be aware of the accessories available for concrete forming and the various staging products and techniques used in the process of erecting structures.

Essential Learning Skills

Young people make the transition from school to work through a variety of means and circumstances. For some, the transition to a practicing career is done because of goal-oriented planning; for others, the transition may be by happenstance. Not too many years ago, the direction for a person's future work was determined principally by where he or she lived, the occupation of the father, and occupations of acquaintances and others. These provided sufficient exposure to jobs. Youth flowed fairly smoothly into the labor force.

Today, however, the transition for high school youth into the labor market is difficult. So is the transition for adults from obsolete occupations into different ones. In the years ahead, this transition promises to become more difficult because of major changes in the work force. These major changes will involve such factors as dual-career families, the impact of use of computers, the anticipated increase in white collar workers, a surplus of college graduates in relation to their job preparation areas, an increasing mismatch of skills and jobs, a growth in low-paying jobs, and an aging labor force.

A Lifetime of Learning

Thus, it becomes critical that students have the opportunity for further education and training so they can adapt to changes in society and their careers. Schools therefore must somehow prepare students to consider continuing education a viable and, in some cases, essential way to remain marketable in an increasingly competitive workforce.

Essential learning skills are those that individuals must master if they are to continue to grow, learn, and adapt to change. They are not unique to any one subject area; rather students must learn them in order to help them acquire any other knowledge and skills. They consist of reading, writing, mathematics, listening, speaking, study skills, and reasoning, including critical thinking and scientific method.

The Importance of Basic Skills

Employer studies, reports and articles all show that these skills are important. Writing and speaking skills are ranked first in employers' views of areas needing improvement. Acquisition of skills to read printed matter required for jobs ranked fifth. With 90 percent of the work force of 1990 already in the labor market and with an estimated 10 million workers identified as functionally illiterate, change seems to be the order of the day. Mastering basic, essential skills to equip future workers for change is an important outcome of modern vocational education.

Concerned Oregonians are evaluating the Essential Learning Skills publication. By reviewing a preliminary copy, action can be taken to produce an improved vocational cluster program. The Department's Curriculum Director is prepared to furnish information and progress reports upon request for this important phase of the Action Plan for Excellence.

The following outline of performance standards for essential learning skills represents the range of skills that vocational teachers can teach and reinforce as they perform subject matter updating.

Students will be able to

1. **Demonstrate use of vocabulary, speech, numerals (figures, letters, words) and other appropriate symbol systems essential for effective communication, computation and problem solving**

   1.1 Recognize words commonly used in grade-level materials

   1.2 Determine meaning of unknown words commonly used in grade-level materials

   1.3 Speak with standard pronunciation, appropriate volume, rate, gestures and inflections

   1.4 Use number/numeric figures, letters, words, symbols, concepts to count, compute and communicate quantitative data

   1.5 Recognize and use geometric patterns, relationships and principles to describe and classify

   1.6 Recognize and use mathematical patterns, relationships and principles to quantify problems or make predictions

   1.7 Estimate and measure quantities, areas and objects; define problems, develop hypotheses, select appropriate methods of computation, solve problems

2. **Interpret the literal meanings of information in written, visual and/or oral communication**

   2.1 Identify main ideas, supporting details, facts, and opinions presented in written, oral and/or visual formats

   2.2 Use instructional materials as basis for gaining knowledge and/or improving comprehension

   2.3 Use oral communication to give/receive information and/or directions

3. **Interpret the implied meanings of information presented in written, oral and/or visual communications**

   3.1 Comprehend implied meanings of written and oral communication

   3.2 Use oral communication to imply meanings and convey ideas, feelings, attitudes

4. **Evaluate content and use of oral, audio and visual communications**

   4.1 Make judgments about the significance and accuracy of information and ideas presented in written materials

   4.2 Use oral communication to respond to others' efforts to persuade and/or to influence others' beliefs and actions

   4.3 Listen with discrimination to the sounds of nature, language, music, and environment

   4.4 Listen, read, view presentations of mass media with discrimination

5. **Generate, organize, express, and evaluate ideas in oral, written, or visual forms**

   5.1 Use a variety of techniques to generate writing and speaking topics (prewriting)

   5.2 Organize ideas in understandable sequence: introduction, body, conclusion; problem solving; spatial, chronological or topical (prewriting/planning)

5.3 Select appropriate form of writing based on audience and purpose

5.4 Present ideas in understandable sequence on the topic selected (drafting)

5.5 Use language, gestures, symbols appropriate to audience, purpose, topic and setting to convey oral information (making oral presentations)

5.6 Evaluate and revise own writing for meaning, clarity, and comprehensiveness (revision)

5.7 Apply the conventions of writing to produce effective communication (editing and proofreading)

6. Plan and carry out problem-solving strategies related to varied assignments in an organized and systematic manner

6.1 Use problem-solving strategies to address varied assignments

6.2 Select most appropriate tools, methodologies, processes, operations in solving problems related to varied assignments

7. Manage time, instructional resources, and personal habits and attitudes constructively in order to accomplish learning tasks

7.1 Clarify purposes of assignment

7.2 Use resources beyond the classroom

7.3 Use study techniques

7.4 Use reading rate appropriate for assignment

7.5 Follow a study plan

7.6 Keep study materials organized and accessible

7.7 Maintain appropriate physical and emotional practices

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